Does Schumpeterian Creative Destruction Requires so many Job and Labor Flows ?
Mixed Evidences

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Abstract

The use of an employer/employee database permits improved monitor of establishments and an appreciable reduction in the estimate of French job flows (JF), to 7% from 15% in the absence of controls. The previous estimate was 10%, but this was at enterprise level and without the smallest ones, which introduces a downward bias compared with the establishment level. Annual JF are thus lower in France than in the USA, in accordance with the common belief about a much less flexible labour market in France. However, quarterly JF seem closer to US ones, which contradicts the view of Blanchard and Portugal who predict that the gap should be lower on low frequencies. Besides, worker flows (WF) can first be interpreted directly in relation to JF and are then considered as the resultant of trial and error in the framework of a matching process. *In fine*, high WF is then necessary for the sake of the effectiveness of the Schumpeterian creative destruction process. Conversely, if one concentrates on the excess of WF over JF (i.e., CF (churning flows) = WF – JF), it may also be interpreted as an autonomous phenomenon dependent on sectoral characteristics or on enterprise fixed effects. Focusing uniquely on the first interpretation in an analysis of the French labour market leads to inconsistencies, so that the second interpretation seems preferable, without being exclusive of the first. A more refined analysis shows that CF are highly autonomous in relation to WF when infra-annual periods are removed, that this remains true, to a smaller extent, at monthly level when infra-monthly periods are removed and that, on the other hand, infra-monthly periods of employment are more correlated to monthly JF. The sectors with the highest employment and manpower volatility are also the fastest-growing sectors, but this is mainly a reflection of an opposition between manufacturing industries and other industries and is less evident within non-manufacturing industries taken on their own. The negative relationship between sectoral volatility and attractiveness for workers already employed seems, for its part, to be more robust.

I INTRODUCTION

The literature on job flows (JF) and on worker flows (WF) initially stressed the importance of the volumes involved in relation to the very modest net job flows. This lead to a renewal of Schumpeter's standpoint about creative destruction. As this process of creative destruction has become all the more important for global performance that the economy had approached the technology frontier, international comparisons of JF has rapidly become an issue. The theoretical literature predicts that employment protection legislation should depress JF and WF but empirical studies give a picture, which is not as clear cut (OECD, 2004). This could be due to "the frequency at which we look at employment changes" (Blanchard and Portugal, 2001) - the comparison of quarterly job flows give results more in agreement with theory - or due to data comparability issues. This paper proposes a new measure of JF in France that takes into account the demography of plants.

Joint analysis of JF and WF is another issue, which has received more and more attention. Quite apart from the obvious fact that one JF implies at least one WF, there is a great temptation to relate WF to JF, either from the purely descriptive standpoint (Davis & al., 2006) or to incorporate both these types of flow in a single theoretical framework (Cahuc 2004, Pries 2005). In this framework, the large number of WF in relation to JF is explained by a learning process regarding the quality of the matching. Other authors have looked more specifically at the excess of WF over JF, i.e. the "churning flows" (CF) and reject this interpretation, concluding that the CF are related to the fixed characteristics of enterprises (Burgess & al., 2000). This is in accordance with a pioneer work on Dutch data, which concluded that "Labor turnover is to a large extent a self-driven process that is only connected to job creation and job destruction" (Hamermesh and al., 1996). The paper confirms this last conclusion.

This literature deals mainly with the American market and the United States is investing heavily in the development of longitudinal databases, aware that, as is stressed by Davis, "high-quality longitudinal links are essential for accurate labor market flows. Broken links create spurious entry and exit, overstating job flows, and spurious job-to-job transitions, overstating worker flows". A major ongoing programme, the LEHD†, will make it possible to study jointly the point of view of the worker and that of the enterprise (Abowd & al., 2004).

There is no longitudinal database in France monitoring enterprises/establishments[1]. Studies of JF are made by matching annual databases, meaning that it is not possible to use changes in identification numbers. Moreover, the studies of WF use establishment databases with restricted coverage (at least

† Explanations of the principal acronyms used in the article will be found in an Annex.

[1] The exception being BRIDGE, until 2001, for the monitoring of establishments with more than 50 employees.

50 employees in the case of the DMMO[2]), while studies of JF, the most recent of them at least (Duhautois, 2002), are based on databases of enterprises with a wider but still non-exhaustive coverage. There is nevertheless one source of an administrative nature that makes it possible, following substantial data re-processing, to deal with this question. These are the DADS databases, bringing together the Déclarations Annuelles de Données Sociales for all employers other than the central government civil service. The combined existence of an identification number for the employer and another for the employee makes it possible to pick out changes in identification numbers and the restructurings due to grouped flows that can then be seen between the old and the new identification number. This work has been carried out for only two years and I shall not deal with the question, omnipresent in the literature, of the dynamics of these flows as a function of the short-term economic situation.

Using this source, this article proposes to analyse JF and WF jointly and, for the first time in France, to do so on the basis of quasi-exhaustive coverage[3]. I intend to show, first (Section I), that inclusion of data on establishments sharply reduces the figures for JF – JF are shown to be distinctly smaller in France than in the United States – and, second (Section II), that interpretation based on matching is inadequate to describe WF properly.

Prior to this, however, a brief examination of the figures most frequently quoted in public debate in France[4] makes it possible to show, without further examination, that interpreting WF uniquely in terms of a matching process leads to an impasse. Just a few figures will suffice to show this. Every day in France 10,000 jobs are destroyed and 10,000 jobs are created, while there are 30,000 recruitments and 30,000 terminations. On average, an enterprise that creates one job during a given year recruits five people and terminates four others, and the loss of one post leads to three recruitments and four departures (Abowd and al., 1999). If there are 10,000 job creations and 10,000.destructions every day and if there are five recruitments for one creation and three recruitments for one destruction, a rapid –perhaps too rapid – calculation shows that we should be seeing 80 000 recruitments per day, not 30,000.

It is necessary to go back to the construction of these figures to reduce the gap somewhat. The figure of 10,000 job creations (destructions) per day is an order of magnitude deduced from the annual rates of job creations and destructions, which is estimated at 10% (Duhautois) and raised to 15% by Cahuc

[2] There is a survey (EMMO) dealing with establishments with between 20 and 49 employees, which is used by the DARES to calculate turnover rates.

[3] Two French studies tackle JF and WF jointly using the DMMO (50 employees or more): one by Abowd & al. (1999), which is frequently referred to in this article, and one by Lagarde & al. (1996), dealing with a different problem area and incorporating changes in skill levels and internal promotions, which is not possible here. The skill level (PCS is coded in the DADS but the quality is too poor to be exploited in this study. Whereas Amossé (2003) arrives at a rate of internal promotion of 0.5% for employees staying in the same establishment, rates of the order of 5% are obtained. More serious is the fact that substantial moves to a lower skill level are recorded: 6% of the intermediate grades remaining in the same establishment are classified as manual or non-manual worker the following year.

& Zylberberg in order to take into account both infra-annual movements and changes in the job (skills) structure within enterprises[5]. The figure of 30,000 recruitments per day (26,000 in the market sector) is an order of magnitude deduced from the turnover rate published regularly by the DARES: every year, for every hundred employees present in an establishment, there are roughly 40 entries and 40 departures[6]. The ratios of recruitments to job creations or destructions incorporate the changes in the skills structure (ignoring internal promotions) and the infra-annual changes in the volume of employment already included in the 10,000 figure, meaning that they are therefore counted twice over. It is in fact necessary to apply these ratios to the annual JF rates (10%) before the adjustments bringing them to 15%. Taking just the market sector, the daily number of recruitments would then come to 53,000, twice the observed figure of 26,000.

It is possible to examine the compatibility of these figures, which are seen from the enterprise standpoint, with what is known from other sources about the labour market from the employee standpoint in terms of changes in employment from one year to another. Eliminating infra-annual periods of employment, one arrives at three recruitments for one post creation and two layoffs for one post destruction. The estimation of recruitments and layoffs on the basis of JF and the ratio of recruitments to flows also leads to an order of magnitude at least twice as large as that obtained on the basis of the Employment Survey. Considering that for one job creation there are k_d departures and $k_d + 1$ arrivals and for one job destruction there are k_a arrivals and $k_a + 1$ departures, then

$$Departures = k_d FCreations + (k_a + 1)FDestructions$$
$$= (1 + k_d + k_a)Min(FC, FD) + NetF(k_d(FC > FD) + (1 + k_a)(FC < FD))$$

On average (1999/2000 being exceptional in this respect) the net flows are very small in relation to the JF and it is possible to write as a first approximation:

$$DepR \approx (1 + k_d + k_a)ARDR$$

where ARDR, the annual redistribution rate, is equal, in periods of employment growth, to the destruction rate (see Box 2 for definitions and notations).

With $k_d = 1$, $k_a = 2$ *and ARDR= 10%,* the departure rate obtained is 40%.

Taking now the Employment Survey, the published figures show a rate of 9% for job-to-job mobility (2.8% within the same enterprise and 5.9% involving a change of employer, Amossé) and a rate for exit from employment of 7% (CERC), giving a departure rate of 16%. This rate applies to all

[4] See, on this point, Cahuc & Zylberberg (2004) and Cahuc & Kramarz (2004).
[5] Applying the rate of 15% to the 16 million employees in the market sector and to 240 working days gives 10,000 job creations per day.
[6] Applying the rate of 40% to the 16 million employees in the market sector and to 240 working days gives 26,000 or 27,000 hirings per day. The authors have raised this figure to 30,000 in order to take into account movements in the civil service and in the non-profit sector (Cahuc & Kramarz).

employees. Direct examination of the 2000 Employment Survey – the year with the highest mobility (Amossé) – gives, depending on the variables and constraints chosen, a range from 16% to 20% for the departure rate of employees in the private sector. The OECD Employment Outlook for 1996 gives a figure of 17% for France in the case of employees with less than one year of service.

Certain biases can be invoked to explain the differences between these results, but these cannot fully explain the differences and, moreover, if taking some of them into account tends to reduce the gap -- for example, a risk of sampling bias in the Employment Survey, in which those with the most precarious jobs seem to be less well covered[7] - others are in the other direction. For example, the figure of 10% for the gross flow is calculated at the enterprise level, whereas the rates in the Abowd study apply to the establishment level and are from a source in which the smallest enterprises are absent. Taking this point into account would increase the redistribution rate by at least 5 points and hence the departure rate by at least 20 points.

Two major elements make it possible to re-establish a certain consistency between these different approaches:

1. One is to see, beyond the measures of destruction and creation and those of changes in employer, what concept of employer is being applied. Is a change of employer as defined for the purposes of the sources dealing with enterprises (a change in the SIRET number) the same thing as a change of employer as seen by the employee?
2. Another is to investigate the links between JF and WF. Is it relevant to interpret this in terms of trial and error with a view to optimising the matching process? Admittedly, one can always construct a ratio of recruitments to creations but if the underlying process is not the one implicitly expressed by this ratio, its generalisation to the whole of the economy calculated for persistent establishments with at least 50 employees (those that tend to have the relatively smallest JF) cannot be justified.

These two points will be discussed in turn in the following two Sections.

II Taking grouped mobility into account makes it possible to revise employment JF downwards

Measuring JF: methodological questions

Calculating JF consists of cumulating the amplitudes – i.e. the absolute values – of the evolutions in the stock of employment of units observed between two dates. The measurement depends principally on four major factors:

1. The level of observation.

2. The coverage of observations
3. The quality of the data
4. The setting of the dividing line between movements that cannot be regarded as job destruction or creation and the rest

1 -The level of observation

Moving from a refined level, the establishment, to a more aggregated level, the enterprise or the group, modifies JF in two ways:

1. Like for like, moving to a more aggregated level involves a netting-out process between the different variations in workforces of establishments and taking only the net resultant. This reduces the measure of flows.
2. External growth operations can, on the contrary, create flows at aggregated level that do not exist at the more refined level. This increases the measure of flows.

Effects related to changes in consolidation perimeter are undesirable. If enterprise A disposes of establishment E with a workforce of n employees to enterprise B, this results in a gross flow of 2n jobs whereas there has in fact been neither creation nor destruction of jobs.

For this reason, the calculation of JF on the basis of establishments is distinctly preferable.

We shall not deal here with the question of intra-establishment movements related to skills restructuring.

2 -The coverage of observations

The coverage involves, first, the sectoral field and legal status of the units (establishments or enterprises) taken into account and, second, the size of these units. This second element is in most cases determined by the source. The work carried out so far on French data most frequently excludes the smallest units, and this leads to a downward bias (JF are relatively more intense in the case of the small units). Karame, Le Minez and Mihoubi (1999) put the underestimation of JF calculated on the basis of surveys with a size threshold at 2 to 3 points (by comparison with administrative sources such as UNEDIC or SIRENE).

3 - The quality of the data

Any database has Imperfections, even if only collection gaps, which introduce an upward bias into JF, since any gap is counted as a destruction and then as a creation. It is remarkable that before any

[7] The mobility bias – meaning that those who move house drop out of the sample – is controlled by using one third of the sample questioned for the first time.

reprocessing takes place the various databases of administrative origin give similar estimated JF rates. Only EPURE shows distinctly lower JF, but with partial coverage.

	Total workforce	Establishment	Enterprise
DADS	13778966	38.4%	27.9%
UNEDIC	13560677	39.2%	28.2%
EPURE	9037001	32.7%	
FICUS	14393499		29.1%
BRN	12699688		26.9%

Coverage: establishments belonging to enterprises in sectors EB to EQ[8] (NES, see http://www.insee.fr/en/nom_def_met/nomenclatures/nes/html/nes_n1.htm) (including temporary agency workers in this case) and with legal categories codes 1,4,5 or 6 (see http://www.insee.fr/fr/nom_def_met/nomenclatures/cj/cjniveau1.htm).
The workforce figures are for 2000. In the case of UNEDIC and EPURE, the coverage was determined by the matching with enterprises in the DADS. This explains the lower figures.

The UNEDIC and FICUS sources cannot be taken further unless the collection gaps are filled (reducing the rate by 1 point in the case of UNEDIC) and, for the enterprise level, unless structural modifications are taken into account. Taking into account the SIRENE information on the ETEC (which makes it possible – but only for ICS – to establish a link between the establishment that has ceased activity and a created establishment more easily than by using the sparse information on takeovers and the information on transfers of establishments, involving the below-mentioned problems of long-distance transfers) and applying this information to the UNEDIC data reduces the rate by 5 points. Duhautois, by eliminating the largest variations in employment, brings the JF rate at enterprise level to 20%.

Only the DADS databases make it possible to observe the JF in more refined manner and to detect restructurings at establishment level (Box 1)

4 - What flows should be neutralised in the measurement of JF?

Enterprise demography has a major impact on JF. The seminal paper on JF states that establishment creations (disappearances) account for 20% (25%) of job creations (destructions) (Davis et Haltiwanger, 1992). In the case of France, Duhautois (2002) arrives at a figure of 36% at enterprise level, whereas analyses at establishment level attribute more than half the JF to enterprise

demography (OECD 1994 according to Karame). However, there are serious doubts concerning the interpretation of these demographic movements in terms of JF. A change of address for an establishment, even when the new address is very similar to the old, or a change of legal status implies a change of SIRET number and it is in most cases[9] incorrect to infer that n jobs have been destroyed and n jobs created. Taking into account information regarding the nature of the creation of establishments in the SIRENE list leads Karame et al. to divide by half the importance of enterprise demography compared with the figures published by the OECD.

Using grouped mobility makes it possible to identify demographic movements in a more exhaustive manner than is possible with SIRENE. It also makes it possible to identify more complex movements than a simple change of SIRET number. If it were possible to attribute economic significance, one could discuss the appropriateness of eliminating one type of flow and not another: for example, the campaigns for restructuring within the civil service can show grouped movements that do not correspond to transfers of posts[10] whereas the outsourcing of IT services to a new structure, but employing the same people, corresponds to transfers of posts whose assimilation to creation and destruction of jobs is disputable. Lacking such a possibility, we have to be content with distinguishing between grouped flows of a demographic character (defined below) – which will be systematically neutralised by consolidation of the establishments concerned – and other grouped flows. Two measures of JF will be proposed: one without elimination of these other grouped flows and one with.

The characterisation of grouped movements

Grouped movements correspond to a more or less simultaneous shift of one group of employees from establishment A (identified by its SIRET number) to establishment B (identified by its different SIRET number).

In most cases, these flows reflect events related to establishment demography: a change of address – entailing a change of identification number – or the takeover of an establishment by another enterprise. In the latter case, it will be preferable to eliminate the corresponding JF. There are two qualifications to be noted, however:

a. In the Employment Survey, the change of address is often assimilated to a change of establishment. This means that one would be moving from a broader view – not taking account of the grouped flows – of the change of establishment to a more restrictive view than that of the Employment Survey[11] ;

[8] All sectors except agriculture and administration
[9] If the distance separating the two addresses is substantial or if the change of status has consequences for the employees, the question remains open.
[10] As these flows cancel each other out to a large extent, the measurement of JF remains the same, whether or not the grouped movements are eliminated.
[11] Given the nature of the questionnaire in the Employment Survey and remembering that mobility is calculated solely on the basis of new surveys, and hence on retrospective declarations, it is probable that minor changes of address are not reported.

b. In the case of a consequent change of location, it is not certain that these flows should be eliminated: the transfer of an establishment with 50 employees from Lille to Marseille does indeed mean 50 job destructions for Lille and the surrounding region and 50 job creations for Marseille and its surrounding region. However, the fact that transfers of establishment are identified on the basis of the actual movements of employees constitutes a natural filter for this difficulty. It is unlikely – and this has been verified in a comparative study of workplace mobility and residence mobility not taken up here – that more than half the Lille employees will make the move to Marseille.

Apart from demographic events, grouped mobility has various possible causes. These include: outsourcing of a service such as IT, with the employees being taken over by another enterprise, spin-offs in which a team follows its leader and restructuring campaigns in the civil service or very large enterprises.

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Box 1

Data and coverage

The DADS databases bring together the Annual Declarations of Social Data for all employers other than the central government civil service. The co-presence of an employer's identification number and an employee's identification number (anonymous and permitting chaining only for two years) makes it possible to identify changes of identification numbers and restructuring due to grouped mobility as revealed by the old and new identification numbers.

The basic unit of observation in the complete employee database (roughly 40 million observations per year) is a period of employment of employee X in a SIRET establishment A. There may be more than one period of employment of X in A during a given year. It is therefore possible to calculate the stock of employment at any given date for the calculation of JF and to know the departures and arrivals for the purpose of calculating the WF. However, unlike surveys dealing with manpower movements such as the DMMO, it gives no information on the type of contract (CDD, CDI) or on the reason for the departure (resignation, dismissal, expiry of CDD, etc.).

Several difficulties have to be overcome before the database can be used:

- Series breaks at the time of the move to a new calendar year
- The presence of numerous errors in employee identification numbers
- The existence of enterprises that make joint declarations for several establishments and which are liable to change their declaration practice

- Unusual handling of discrepancies in timing of pay, resulting in over-numerous departures in November and December of employees who then return in January
- Collection gaps.

A single figure will suffice to show the scale of the problem of data quality: 21% of the employees present in an establishment on 31 December 1999 are no longer reported as being in the same establishment on 1 January 2000.

Various reprocessing methods have been applied in order to improve the quality of this database – and further improvements are still possible – remembering that observation of grouped mobility, in the case of the utilisation that concerns us here, is both one of the principal advantages of the source for handling changes of establishment identification number and also one of the main ways of achieving improvement. For example, it can be seen that in the event of a change of ownership, it is relatively frequent that the former owner fails to make a declaration for the final period of his ownership. Grouped mobility makes it possible to identify the arrival on 1 May of the following year in another establishment of employees leaving on 31 December. It is then possible to complete the data for the presence of these employees between 1 January and 30 April.

We are interested in periods of employment occurring between the 110th day of 1999 and the 110th day of 2000. Almost 36 million periods of employment have a non-null intersection with the analysis period of one year running from April 1999 (D110) to April 2000 (D470) (see Table). They are occupied by roughly 23 million different employees, if one takes into account the fact that when the identification number is incorrect (5% of cases) this tends to overestimate the number of different employees.

Breakdown of period of employment (thousands)

	Posts D110	% wrongly numbered	% persistent*	Infra-annual posts	% wrongly numbered	Posts D470	% wrongly numbered	Total periods of employment	% wrongly numbered	% persistent *	% infra*
A	13 464	2.3%	64%	5 009	7.0%	13 935	2.0%	23 681	3.7%	37%	20%
B	1 006	2.0%	4%	2 029	3.5%	1 115	2.6%	4 108	2.9%	1%	49%
C	3 149	1.5%	77%	594	5.3%	3 185	1.2%	4 529	2.3%	54%	13%
D	1 648	2.2%	58%	1 017	3.6%	1 705	1.9%	3 407	3.5%	28%	30%
Total	19 266	2.2%	64%	8 650	5.7%	19 940	1.9%	35 726	3.4%	35%	24%
Number of employees	18 029	2.3%				18 555	2.0%	23 653	4.8%		

- % of correctly numbered

A. For profit sectors other than temporary agencies

B. Temporary agency employees
C. Civil service, public hospitals and local authorities
D. Non-profit institutions

How to read the table: in April 1999 (D110) 19.3 million posts were occupied by 18 million employees. For 2.2% of these posts, the employee identification number was wrong. Of the correctly numbered posts, the permanent posts (occupied continuously from April 1999 to April 2000 (D470)) accounted for 64% of the posts on D110 and 35% of the total periods of employment during this period. There were 8.65 million infra-annual periods of employment, i.e. periods starting after D110 and ending before D470. Of these, 5.7% had a wrong identification number. Those with a correct identification number accounted for 24% of all the correctly numbered periods.

The sector carrying the letter A is the principal field for the study. It will be known simply as the profit sector (including public services such as EDF - electricity - or SNCF - railways).

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Mobility in the broad sense will be defined as any transition between two periods of employment of which at least one falls within [D110 - D470]. There is a presumption of grouped mobility if at least two employees move from establishment A to establishment B. This is the case for almost half the movements. In this article, grouped mobility is not the subject of analysis *per se*, but is simply an instrument for improved measurement of JF and of manpower. This means that we shall simply define the criteria for breaking down this grouped mobility into three categories:

a. Mobility related to establishment demography
b. Joint mobility on a scale that indicates that it cannot be a case of simple coincidence of independent individual movements. This will be known as simple grouped mobility.
c. Mobility on a scale that places it below the thresholds for demography-related mobility and simple grouped mobility. This will be known as multiple flows and will not be used in the corrections applied to the measurements of flows.

Grouped mobility often involves establishment demography

A demographic relationship between two establishments is defined to exist when at least half the employees of one establishment go to (or come from) the other. This relationship, established by comparing the situation on day D of year n with that of day D of year n+1 (Picart, 2006), is defined here on the basis of infra-annual flows, which makes it easier to trace mobility, especially in sectors with high labour turnover (it is quite possible that the employees going from A to B on D+30 will no longer be in B on D470). There are three types of demographic relationship:

1. A sale relationship when more than half of the employees of A move to B : $\sum_{K=J-D}^{J} FLD_{AB,K} > Ef_{A,J-D}/2$
2. An outsourcing relationship when more than half of the employees of B come from A : $\sum_{K=J-D}^{J} FLA_{AB,K} > Ef_{B,J}/2$
3. A continuity relationship when both the preceding relationships between A and B hold.

Where

. *J* : end of observation window
. *D* : length of observation window
. $FLD_{AB,K}$: number of employees present in A on J - D and leaving A on day K to go to B (no constraint on the day of arrival in B)
. $Ef_{A,J-D}$: dependent employees of A on J - D
. $FLA_{AB,K}$: number of employees present in B on J and arriving in B from A on day K (no constraint on the day of departure from A)
. $Ef_{B,J}$: dependent employees of B on J

D must be neither too long (in which case there is a tendency to eliminate the mobility from A to B in the case of employees arriving in A after J - D), nor too short (all the employees moving from A to B do not necessarily do so on the same day). The sales and outsourcings recorded are those resulting from the use of a one-quarter window and a one-half-year window. Flows between A and B outside the period used to define the demographic relationship are assimilated to this relationship. For example, in the case of sales, 90% of the flows are within the quarter used to define the sale relationship.

It will be noted that, on this definition, an establishment can be sold while still retaining part of its workforce. Note, finally, that roughly two thirds of the grouped movements of a demographic nature consist of intra-group operations[12].

Breakdown of joint mobility (thousands)

	Same enterprise				Different enterprise			
	Number of pairs		Number of movements		Number of pairs		Number of movements	
Continuity	24	23%	427	43%	20	4%	420	19%
Sale	9	9%	87	9%	12	3%	109	5%
Outsourcing	9	8%	134	14%	11	2%	139	6%
Other	62	60%	340	34%	437	91%	1 597	71%

[12] This point is dealt with in greater detail in a more complete version of this article.

Total	103	100%	987	100%	480	100%	2 265	100%

How to read the table: 24,000 continuity relationships were established between two SIRETs within the same enterprise. These represented 23% of the pairs of establishments (A,B) within the same enterprise meeting the criterion that at least two employees go from A to B. These 24,000 continuity relationships involved 427,000 movements, equivalent to 43% of the joint movements between establishments within the same enterprise.

Demographic relationships account for 66% of the joint movements within the same enterprise and 29% of those where there is a change of SIREN. While joint mobility with demographic relationships is unequivocally grouped mobility, other forms of joint mobility mix together grouped mobility and multiple flows resulting from individual decisions that are independent of one another. Multiple flows can be expected to be spread over the year, whereas grouped flows are likely to be concentrated in time. For each pair (A,B) in which there are at least 3 mobility observations, if one takes the two-month period with the largest number of grouped flows, only 5% of the movements lie outside this in the case of continuity or sale relationships between A and B. The percentage rises to 34% for pairs where there is no demographic relationship. This figure is still quite low and suggests that genuine cases of grouped mobility represent the majority of the latter.

The greater individual mobility shown by younger workers makes it possible to set thresholds for the selection of grouped flows

If one makes the assumption that grouped flows – apart from the very small number of special cases such as spin-offs – are involuntary, then the age structure of the grouped flows must reflect that of the source establishments. And as individual mobility declines markedly with age, the stability of flows by age, for a given size of establishment, can be regarded as a selection criterion for grouped flows. The analysis is based on a 1:25 sample of men aged between 18 and 62 born in October of an even-numbered year and occupying a significant post on D110 (at least 2 hours per day during at least 100 days) in the principal field covered by the study, giving 304,000 periods of employment.

In the case of the large establishments, it emerges clearly that grouped flows involving only 2 to 4 employees are more a matter of individual mobility than grouped mobility. For larger numbers, the diagnosis is more problematical. While younger workers seem to be less involved in mobility involving at least 100 employees, this is probably because they have a greater likelihood of having changed establishment prior to the restructuring. On top of this criterion of size of flow, there is added the criterion of type of flow: when it is certain that a takeover or a sale is involved, the independence vis-à-vis age is confirmed. Younger workers are even less involved when the grouped flow is of the same order of magnitude as the establishment. This phenomenon is seen for all sizes of establishment and is easily interpreted: a younger worker has a greater likelihood of having left the establishment before the occurrence of the grouped flow.

Mobility from establishments with 250 employees or more

	18 - 24	26 - 34	36 - 50	52 - 62	24-52+
Number of employees	2813	21005	44810	18135	
Isolated movements	301	114	43	42	7.2
2 flows	27	13	5	1	19.3*
3 to 4 flows	22	11	4	3	8.5*
5 to 9 flows	15	10	5	4	3.9
10 to 49 flows	18	14	11	8	2.1
49 to 99 flows	6	6	4	5	1.2
100 and over	53	58	64	70	0.7

How to read the table: In the establishments with at least 250 employees, there are 21,005 men aged between 26 and 34 in the sample occupying a significant post on D110. For every 1000 of these, 114 show isolated mobility and 13 show mobility towards an establishment B to which one and only one other employee from the same source establishment also moves. Men aged less than 25 are 7.2 times more likely to make an isolated move than men aged over 50.

* these high ratios are due to temporary employees who are mostly young people. See next table where temporary employees are shown in a separate row.

"Young"/"old" ratio as a function of the size of establishment and size of flow

	1 to 4 employees	5 to 9 employees	10 to 19 employees	20 to 49 employees	50 to 249 employees	250 employees or more
Single flow	2,6	4,1	4,1	4,3	4,7	7,2
Group of 2	3,1	**1,3**	2,6	2,7	2,9	8,7
3 or 4		2,7	**0,6**	**1,5**	2,7	5,1
5 to 9			**0,2**	**1,0**	2,3	2,6
10 to 49				**0,8**	**0,8**	**1,7**
50 to 99					**0,6**	**1,3**
>100						**0,9**
Demography related mobility	0,6	0,6	0,7	0,7	0,8	0,7
Same SIRET	1,1	1,8	1,6	2,0	2,1	3,5
>1, Temporary employees		8,5	8,1	25,8	32,2	78,2

The above table then makes it possible to set thresholds for grouped flows as a function of size of establishment. The cells in bold type undoubtedly relate to grouped flows and the shaded cells can be

assimilated to individual flows (they will be referred to as multiple flows in order to distinguish them). In between, there are ambiguous cells, some of them probably including partly grouped flows and partly individual flows (these will be referred to as mixed flows). The distinction is fairly clear in the case of establishments with more than 10 employees, much less so for the smallest establishments. The mixed flows, which form a negligible proportion, are assimilated to the grouped flows. Multiple flows represent 10% of the total mobility observations.

********** Box 2 **********

Breakdown of flows and construction of rates

The period of employment constitutes the basic building block of the analysis, especially at infra-annual level. The period of employment is characterised by its start date (Ds) and its end date (Df). Given that the period of analysis runs from D110 (20th day of the 4th month of 1999) to D470 (20th day of the 4th month of 2000), a distinction is made between:

- The continuous periods $Ds \leq D110 < D470 \leq Df$ PP
- The periods that finish $Ds \leq D110 \leq Df < D470$ PT
- The periods that start $D110 < Ds \leq D470 \leq Df$ PC
- The infra-annual periods $D110 < Ds \leq Df < D470$ PI

We have the following identities:

- Number of periods $NbPer = PP + PT + PC + PI$
- Employment on D110 $EP_n = PP + PT$
- Employment on D470 $EP_{n+1} = PP + PC$

Aggregated amounts will be denoted in capitals (for example, EP) and amounts at establishment level by putting only the first letter in capitals (for example, Ep).

Breakdown on an annual basis: infra-annual periods are ignored

At establishment level:

- Evolution $Ev = Ep_{n+1} – Ep_n = Pc - Pt$
- WF $Wfa = Pt+ Pc$
- Permutation $Pmt = Wfa - Abs(Ev) = 2 Min (Pc, Pt)$

At aggregated level

- Net job flows (evolution) $NF = \sum Ev$

- Creation flows $CF = \sum_{Ev>0} Ev$
- Destruction flows $DF = -\sum_{Ev<0} Ev$
- JF $JF = \sum Abs(Ev) = CF + DF$
- Annual Redistribution $ARD = JF - NF = 2Min(CF, DF)$
- WF* $WFa = \sum Wfa = PT + PC$
- Permutations $PMT = WFa - JF = \sum_{Pt>Pc} 2Pc + \sum_{Pt<Pc} 2Pt = \sum Pmt$

Giving the breakdown of WF: $WFa = NF + ARD + PMT$

*: The WF calculated on an annual basis, i.e. taking only the situation of employees on D110 and D470, are slightly smaller than those that would be calculated using periods of employment directly, since some employees are present on D110 and D470 without being continuously present between the two dates (so that a PT period and a PC period exist for one and the same employee).

Breakdown on an infra-annual basis

At establishment level:

- Evolution $Ev = Ep_{n+1} – Ep_n = Pc - Pt$
- Total JF* $Jft = \sum_{m=1}^{12} Abs(Ep_{D110+30*m} - Ep_{D110+30*(m-1)})$
- Infra-annual JF Jfi = Jft - Abs (Ev)
- WF Wf = Pt + Pc + 2 Pi
- Permutation Pmt = Wf - Abs(Ev) = 2 Min (Pc, Pt)
- Roll-over Rol = Wf - Abs(Ev) - Pmt = Wf - Wfa = 2 Pi
- Turnover T/o = Wf - Abs(Ev) = Pmt + Rol

One would like to be able to separate the WF into flows linked to JF and flows corresponding to simple roll-over on the same job slot and then break down this separation between annual and infra-annual. However, the full breakdown is not possible, because the permutations, which are on an annual basis, can generate infra-annual JF if the post remains vacant for a certain time. In order to have an idea of the WF that are independent of JF, one can calculate:

- Churning flows Cf = Wf - Jft = T/o - Jfi

*The measurement of the JF obviously depends on the unit period chosen, in this case the month. The month is also the unit period chosen in the most recent Davis & al. article (2006), thus permitting comparisons.

At aggregated level

JF

- Net job flows (evolution) $NF = \sum Ev$
- Cumulative net flows $CNF = \sum_{m=1}^{12} Abs(EP_{D110+30*m} - EP_{D110+30*(m-1)})$
- Infra-annual job variations $IAV = CNF - NF$
- Cumulative redistributions $RDC = \sum_{m=1}^{12} \sum Abs(Ep_{D110+30*m} - Ep_{D110+30*(m-1)}) - CNF$
- Infra-annual redistributions $RDI = RDC - ARD$

The accounting identity holds:

$$JFT = NF + AIV + ARD + RDI = (NF + ARD) + (AIV + RDI) = JF + FBI$$

WF

- WF $WF = \sum Wf = PT + PC + 2PI$
- Permutations $PMT = WFa - JF = \sum_{PT>PC} 2PC + \sum_{PT<PC} 2PT = \sum Pmt$
- Roll-overs $ROL = 2PI$
- Churning flows $CF = WF - JFT$

Construction of the rates: the choice of denominator

The choice of denominator raises problems and there is no entirely satisfactory solution. Two possibilities are the starting employment and the average employment. For a certain number of rates, it seems to me to be conceptually preferable to take the smaller of the starting and ending employments: Min(Ep_n,Ep_{n+1}). For example, if no period is continuous, it seems logical to consider that there is total permutation and that therefore PmtR = 1. This is only achieved with the minimum employment. Another advantage of using the minimum employment is that it gives symmetry between increase and decrease: an establishment whose employment increases from 50 to 75 employees will have growth of 50% and an establishment whose employment decreases from 75 to 50 employees will show a decline of 50%. This property is interesting when relating turnover or permutation to annual JF. However, using the minimum employment poses a problem of aggregation. For example, if establishment A's employment increases from 50 to 100, of which 20 are permanent and establishment B's employment falls from 100 to 50, of which 20 are permanent, we have, at

establishment level, PmtR(A)=PmtR(B)=20/50 and, at aggregated level, PMTR=40/150. Using the average workforce, if each establishment has the same rate, this rate will be preserved at aggregated level. We shall therefore be working systematically with the average workforce at aggregate or sectoral level and, at establishment level, choose, case by case, either the average workforce or the minimum workforce.

Another source of difficulty, easy to handle but liable to cause confusion, is the decision whether to count each arrival and each departure as a separate movement or to count as only one movement an arrival with a corresponding departure and as one movement an arrival unaccompanied by a departure (in the case of a net creation).

In the one case, it is only possible to calculate a gross flow rate (which the authors call the reallocation rate):

$\mathrm{Re}\,aR = \frac{GF}{WFm}$, taking values between 0 and 2.

In the other case, the one adopted here, the net flow rate is distinguished from the annual redistribution rate:

$$FNR = \frac{NF}{WFm} \text{ and } ARDR = \frac{1}{2}\frac{GF - NF}{WF_m}$$

Haltiwanger, and Duhautois for the French data, use the reallocation rate. The redistribution involves factor transfers at constant global volume, corresponding to the excess of JF (i.e. to the volume of JF not justified by the net evolution) introduced by Lagarde et al. (1994). If each establishment were to increase its workforce homothetically by 5% (ignoring indivisibilities) there would be no redistribution whereas GFR=NFR =5%. If, on the contrary, half the establishments lose 5% of their workforces and the other half gain 5%, the result is pure redistribution and one then has NFR = 0%, ReaR=5% and GFR=10%. Using this definition, A*RDR* takes values of between 0 and 1. The transition from the one to the other takes the following form:

$$\mathrm{Re}\,aR = \frac{GF}{EF_m} = NFR + 2ARDR$$

In practice, it is the creation and destruction rates rather than the reallocation rate that are the subject of comment in the literature. The redistribution rate is simply the smaller of the two.

All the elements in the breakdowns proposed above can give rise to ratios, respecting the convention of counting only one movement when there is a departure with a corresponding arrival.

********** End of box **********

Taking into account grouped flows halves the redistribution rate

From the unprocessed DADS databases, one obtains NFR = 3.5% and ARDR = 15.8% for the whole universe and 3.5% and 15%, respectively, for the universe consisting of enterprises excluding temporary agency employment. Appearance and disappearance of establishments account for 57% of the grouped flows.

The establishments that are interrelated by grouped movements with a demographic link are consolidated. For this purpose consolidated "envelopes" are constructed that can be considered as equivalence classes of the relation "has a demographic link with". For example, if A, which had 100 employees on D110 is sold to B, which had 200 employees on D110 and 250 on D470, the JF are reduced from 150 (100 - 0 + 250 - 200) with the establishments counted separately to 50 (200 + 100 - 250) with the establishments consolidated. This example also makes it possible to point out that the demographic processing concerns also the persistent establishments (B in this example) and goes further than the simple change of SIRET number following a change of address or of legal status. If the demographic link involves establishments with different statuses (for example, a hospital that changes from being a non-profit institution to a corporation), the consolidated unit is allocated to the category with the higher workforce prior to consolidation.

Simple grouped movements are treated as transfers of employees affecting the workforce of the establishment on D470. For example, if 20 employees go from A to B and if A has 100 employees on D110 and 90 on D470, while over the same period B's workforce increases from 80 to 110, the transfer is neutralised by adding 20 to A's workforce on D470 and deducting the same number from the two workforce figures for B. Prior to this neutralisation, we have gross flows of |100 - 90| + |110 - 80| = 40. After the neutralisation, the gross flows are |100 -110| + |90 - 80| = 20. It is the infra-annual grouped flows that are taken into account, because if one looked merely at the workforce situations on D110 and D470, one would fail to take into account the employees transferred from A to B on, say, D200 and replaced by other employees in B between D200 and D470.

	Before correction		After correction		
	NFR	ARDR	NFR	ARDR (a)	ARDR (b)
All	3.4%	15.8%	3.7%	8.3%	7.2%
Profit sector	3.5%	15.0%	3.5%	7.8%	7.2%
Temporary agency workers	10.5%	56.3%	12.2%	26.8%	16.9%
Civil service	1.4%	6.2%	1.4%	3.3%	2.8%
Non-profit institutions	2.2%	15.2%	3.4%	9.2%	9.0%

(a) without taking into account simple grouped flows

(b) taking into account simple grouped flows

The corrections and the taking into account of the grouped flows divide by a factor of 2 the reallocation rates – slightly less than 2 if the simple grouped flows are ignored, slightly more than 2 if they are taken into account.

********** Box 3**********

Are JF lower in France than in the United States?

It is commonly said that JF are of the same order of magnitude (destruction rate of around 10%) in France and in the United States (Cahuc 2004, Pries 2005). If one takes just the redistribution rate (the minimum of the creation rate and destruction rate), the OECD in its Employment Outlook for 1996 gives rates of 11.8% for France and 10.4% for the United States. When Duhautois (2002) compared his results with those of Davis et al., he found identical rates for industry, of the order of 7 to 8%. However, these virtually identical rates were obtained for a database of establishments in the United States and a database of enterprises in France. The Davis et al. database included only establishments with at least 5 employees, and this reduces the rate. On the French side, the fact of taking an enterprise source, which also excludes the smallest units (although numerous enterprises with fewer than five employees appear in it), also reduces the rate. The downward bias should be more important on the French side (enterprise data) than on the US side (plant data).

Using more recent data and taking the whole of the private sector, Pinkston and Spletzer (2004) come to a rate of 14%[13]. This is closer to the one found before correction (16%) than to the one found after correction (7 to 8%). It has to be noted that constant attention is paid in the American databases to taking account of changes in ownership and to neutralising changes in identification numbers (Spletzer et al., 2004). I have not been able to find figures for American flows before correction. Calculating the JF directly from the tables sent by the Census Bureau to the Small Business Administration, I also come to 15%, but these data have already taken into account establishment continuity. In all probability, given the size of the correction in France, the American figure before correction is higher than the French figure after correction. Unless one is prepared to suspect a very large difference in the size of the corrections[14], it has to be concluded that JF must be smaller in France than in the United States. This conclusion does not necessarily contradict the one reached by the comparison between the studies by Davis and Duhautois, since the former uses a longitudinal

[13] The authors are at pains to point out that for the more restricted field of industry they arrive at the same rates as Davis et al.

[14] It is possible that the grouped-flow method applied here is more effective. On the other hand, however, it must not be forgotten that this question of establishment continuity has been addressed by numerous researchers in the United States over many years, while it has so far never been the subject of particular attention in France. One possible failing of the method of matching based on address could be the non-identification of establishment transfers, but it seems that in the United States the identification number is retained in cases of transfer (SBA/census). It is not known, however, what treatment is accorded to restructurings that are not reflected in the disappearance of the source establishment.

research data base (LRD) in which corrections have already been made, whereas the latter, for want of anything better[15], uses a series of annual bases that were not designed to be used longitudinally.

Direct and detailed comparison of the data and working methods would be necessary to affirm this conclusion with more certainty.

********** end of box **********

From one puzzle to another ?

"A puzzle in the recent empirical research on job creation and job destruction flows across countries. The prior belief was that the employment protection led to lower rates of creation and destruction in Europe relative to the United States. But the constructed measures - typically annual rates of job creation and job destruction - have turned out to be surprisingly similar across countries" (Blanchard and Portugal, 2001). The present study shows that we can reasonably conclude that JF are lower in France than is the US (see box 3). It seems as if the "prior belief" were confirmed. But Blanchard and Portugal tell us that in fact we should compare quarterly JF instead of annual JF. Their reasoning is the following: "Think of firm's desired employment as having both a transitory and a permanent component. The higher cost of adjusting employment, the more firms will smooth the transitory component; but they will have little choice other than to adjust to the permanent one. The lower the frequency at which we look at employment changes, the more important will be the permanent component relatively to the transitory component, and thus the smaller will be the effect of employment protection on employment movements". It supports their finding that quarterly JF are much lower in Portugal than in US whereas annual JF are roughly similar. According to this reasoning, we should observe a wider gap between US and French JF on a quarterly basis than on an annual basis. I find the opposite (table).

Job flows in France, Portugal and USA

	Annual JF (a)	Quarterly JF (b)	Persistence Rate : (a)/(4*b)
France	8%	5%	40%
USA (Spletzer, 2004)	14%	7%	50%
USA* (Blanchard & al., 2001)	10%	5%	50%
Portugal* (idem)	9%	3%	75%
France*	6%	3%	50%

* manufacturing only

[15] This author is aware of the difficulty and applies a filter to the individual gross flows. In the absence of this filter, his data lead to a reallocation rate of 29% instead of 20% (see above).

French firms do not seem to smooth their transitory component of demand more than US firms. The frequent use of short-term contracts could be an explanation.

After reprocessing, the large establishments appear to be less job-destructive

Flows by size of establishment before reprocessing

	Thousands				%	Thousands			%				
		Persistent											
Size	Empl. D110	Inc.	Dec.	Net	Per Rate Net	Creation	Destruction	JF		GF rate	Dem influence	Net flow	Red Rate
1 to 4	1 637	300	99	201	12,3	295	277	971	21	59.3	59	13.4	23.0
5 to 9	1 566	176	113	63	4,0	177	177	643	14	41.1	55	4.0	18.5
10 to 19	1 461	139	94	44	3,0	155	158	545	12	37.3	57	2.9	17.2
20 to 49	2 106	197	119	79	3,7	186	200	702	15	33.3	55	3.1	15.1
50 to 249	3 123	239	170	69	2,2	264	265	938	21	30.0	56	2.2	13.9
250 +	3 523	169	185	-16	-0,5	221	187	762	17	21.6	53	0.5	10.6
Total	13 415	1 220	780	439	3,3	1 298	1 263	4 561	100	34.0	56	3.5	15.2

How to read the table: The establishments with between 5 and 9 employees had a total workforce of 1,566,000 on D110. Among these establishments, those that increased their workforces recorded an overall increase of 176,000 and those that reduced them recorded an overall decrease of 113,000, giving a net gain of 63,000 jobs and a net growth rate of 4%. The establishments created between D110 and D470 (or which had no employees on D110) had 177,000 employees on D470, while those which had disappeared (or no longer had any employees) on D470 had 177,000 employees on D110. In total, the JF for this size tranche amounted to 643,000 jobs (643 = 176 + 113 + 177 + 177), or 14% of all the JF, and a JF rate of 41.1%. Creations and destructions of establishments accounted for 55% of these JF. With a net flow rate of 4%, this gives a redistribution rate of 18.5%.

In the absence of reprocessing, the JF linked to creations and destructions of establishments accounted for more than half the JF, including for very large establishments. The reprocessing drastically reduces the flows with a demographic character, except for the establishments with fewer than 5 employees, for which, by construction, the method of identifying establishment continuity by means of grouped flows is less effective: if an employee moves from an establishment with one employee to another establishment with one employee, caution argues against concluding too hastily that there is a continuity relationship between the two establishments. Flows involving persistent establishments suffer less modification inasmuch as the transformation into persistent establishments of establishments that appear or disappear at the time of restructuring tends to compensate for the reprocessing of the persistent establishments. After re-processing, the persistent establishments no longer turn out to be job-destructive. In total, the redistribution rate falls from 15.2% before reprocessing to 7.3% after reprocessing. It is even less than 5% for establishments with at least 20

employees and it can be considered that for establishments with less than 10 employees, the data remain very noisy and this gives an upward bias to the overall rate [16].

Flows by size of establishment after reprocessing

	Thousands				%	Thousands			%				
		Persistent			Per						Dem		
Size	Empl. D110	Aug	Dim	Net	Rate Net	Creation	Destruction	JF		GF rate	influence	Net flow	Red Rate
1 to 4	1 601	265	104	162	10,1	216	186	770	31	48.1	52	12.0	18.1
5 to 9	1 525	166	124	43	2,8	51	32	373	15	24.4	7.3	4.1	10.2
10 to 19	1 441	135	103	32	2,2	28	20	286	12	19.8	17	2.7	8.6
20 to 49	2 092	181	119	62	3,0	25	14	339	14	16.2	12	3.5	6.3
50 to 249	3 168	224	158	66	2,1	25	13	419	17	13.2	9	2.5	5.4
250 +	3 641	153	110	43	1,2	12	1	276	11	7.6	5	1.5	3.0
Total	13 469	1 123	717	407	3,0	357	266	2 463	100	18.3	25	3.7	

The conclusion is much the same at enterprise level, with the redistribution rate declining from 11.4% before reprocessing to 6.5% after reprocessing. Whereas before reprocessing the intra-enterprise JF accounted for a quarter of total JF, after reprocessing they represent only one-ninth.

III WF: the predominance of sectoral determinants

The transition from the enterprise standpoint to the employee standpoint

Posts are not always occupied by the same employees. The number of hirings and terminations – the terms "arrival" and "departure" will be used from now on – will therefore exceed the JF and, in the annual framework to which we confine ourselves for the present, the term "permutation" will be used to describe the excess of departures over job destructions or, which comes the same thing, the excess of arrivals over job creations. In an annual framework, an arrival corresponds to the presence in a post on D470 of an employee who was absent on D110 and a departure to the absence on D470 of an employee present on D110. These arrivals and departures can be identified either from enterprise sources or from employee sources. Whereas in an infra-annual framework the enterprise approach is the more frequent – one then speaks of job turnover – on an annual basis it is the employee approach that predominates through, in France, the Employment Survey. The study by Abowd et al. is to our knowledge the only case of an approach to permutations using enterprise sources.

[16] The use of SIRENE numbers – establishment transfers, takeovers when the predecessor is indicated, establishments having the same ETEC – in order to identify the continuity of establishments that might have escaped the grouped flows reduces the JF by no more than 20,000 jobs. It would be interesting to examine, taking two successive years, the lasting nature or otherwise of the jobs destroyed and created during one year. Haltiwanger stresses the continuing nature of JF but, in his first articles at least, establishments with fewer than 5 employees are excluded from the database.

From the enterprise standpoint,

$$Pmt = \sum Dep - DF = \sum Arr - CF = \frac{\sum Dep + \sum Arr - DF - CF}{2} = \frac{\sum Dep + \sum Arr - GF}{2}$$

$$DepR = \frac{\sum Dep}{WF_n} \qquad ArrR = \frac{\sum Arr}{WF_{n+1}}$$

$$PmtR = \frac{Pmt}{Min(WF_n, WF_{n+1})} = \frac{Min(\sum Dep, \sum Arr) + NF - GF}{Min(WF_n, WF_{n+1})} \approx Min(DepR, ArrR) - ARDR$$

From the employee standpoint, a distinction is made between entries and exits of the population in employment and movements between different establishments.

$$Departures = Movements + Exits = Mov + Ex$$

$$Arrivals = Movements + Entries = Mov + Ent$$

For a more restricted field than the whole economy, it is possible to limit the movements to movements between enterprises within the field and to include in the exits movements to enterprises outside the field (for example, from the enterprise field to the civil service).

The equality between the departure and arrival rates defined respectively from enterprise sources and from household sources is not immediate. Without going as far as to define the post – since one has no knowledge of the skills dimension of the jobs and hence the internal promotion – the notion of the persistent nature or otherwise of the establishment is not necessarily the same. In the enterprise sources it is the SIRET code that, before reprocessing, defines the persistent nature, whereas in the Employment Survey sources, it is the declaration of the employee regarding a possible change of employer. In the absence of reprocessing, the calculated rates diverge widely (see above).

Before reprocessing, one comes to a departure rate of 37%, which, in association with a redistribution rate of 16%, gives an apparent permutation rate of 21%. This rate of 37% is much too high in relation to the indications from the Employment Survey (see above). A major difficulty stems from the fact that many employees have an incorrect identification number; they are therefore lost at the time of the change of calendar year or of employer. Accordingly, 15% of employees occupying a post on D110 seem not to do so on D470. Even taking only employees who apparently have little reason to leave activity, such as men aged between 40 and 45, the rate remains at 9% (it was 7% excluding those experiencing a period of unemployment in 2000). Admittedly, it is possible to be content with deducing the permutation rate from the departure rate estimated on the basis of the Employment Survey (16 to 20%) and from the redistribution rate, giving a permutation rate of the order of 10%. However, in so doing one loses the global framework announced at the beginning of the sectoral analyses of the

labour market. A second reprocessing makes it possible to come closer to the departure rate of 20% by counting only one post per employee and matching the identification numbers disappearing on D360 with those appearing in the same establishment on D361.

	NFR	Employ-ment balance	Non-employment balance	Excl. simple grouped flows			Incl. simple grouped flows		
				RedR	DepR	PermutR	RedR	DepR	PermutR
All	3.2%	0.0%	3.2%	7.1%	21.5%	14.4%	5.7%	20.0%	14.3%
Profit sector	3.0%	0.9%	2.2%	7.1%	20.0%	12.9%	6.0%	18.8%	12.9%
Temporary agency work	13.1%	-11.2%	24.3%	21.1%	69.1%	48.0%	12.2%	59.6%	47.3%
Civil service	1.6%	0.2%	1.4%	2.5%	12.9%	10.4%	1.6%	12.0%	10.4%
Non-profit institutions	2.7%	-1.4%	4.1%	7.9%	24.2%	16.3%	7.3%	23.5%	16.2%

How to read the table: jobs in enterprises rose by 3%, of which 0.9% filled by employees who already had a job outside the enterprise field on D110 and 2.2% filled by workers who were not in employment on D110. If one takes into account only the grouped flows with a demographic link, out of every 1000 jobs on D110, 71 were destroyed and 129 employees occupying non-destroyed posts left their establishment. In all, therefore, there were 200 departures.

The departure rate for enterprises is 19 to 20%, equal to the upper bound of estimations based on the Employment Survey. This gives a permutation rate of 13% (see Table). The redistribution rate is one point lower than that previously calculated. This may be linked to the greater instability of jobs occupied by multi-job employees, whose weighting is automatically reduced by the processing (this explains why the reduction is greater for the non-profit sector).

The permutation rate depends more on the sector and the size of establishment than on the JF. In particular, establishments with stable workforces do not experience fewer permutations than the others[17]. Conversely, the ratio of permutations to JF is inversely proportional to the JF[18]. The interpretation of these permutations must therefore be sought more in the characteristics of the establishment (for example, changes in skills structure) and of its employees (for example, replacement in the case of exit from the labour force) than in its growth. Disconnecting the

[17] Nor does one find, in this case, the asymmetry between destructions and creations pointed out in Section 1. This asymmetry seems to be due to the source used by the authors (the DMMOs), which apply a threshold of 50 employees and in which establishments are present to a greater extent as a function of their workforces at the start of the period than at the end of the period, so that the establishments declining to below the threshold are better represented than those moving above the threshold. As the inflows/outflows in relation to the JF are in inverse relation to the amplitude of the JF, this introduces a downward bias into the inflow-destruction ratio relatively to the outflow/creation ratio.

[18] The tables, available on request from the author, are not reproduced here. In the framework of an interpretation in terms of a matching process, the link with JF must, *a priori*, be stronger in the case of turnover than of permutation. Showing the results relating to turnover is therefore sufficient for the demonstration made here.

permutations from the JF makes it possible, complementing the work on the data, to re-establish a consistent picture incorporating the standpoints of both the enterprises and the employees. Broadly speaking, it can be considered that slightly less than one employee in five leaves his establishment each year. One third of these departures can be attributed to redistributions of jobs between establishments and the rest to permutations.

The monthly JF account for half the WF

The estimation of WF requires additional processing of the databases, since the correction no longer applies just to the limiting dates D110 and D470 but to the whole of the period. In particular, it involves filling gaps in the grouped movements and for contracts ending in December and starting again in January. One obtains a turnover rate of 57% for the enterprise sector excluding temporary agency work, much higher than the 42% from the DARES. The DARES turnover rate is: $T/OR = \frac{Dep + Arr}{WF_n}$. The table below shows a comparison broken down by size tranche.

1. For persistent establishments, the discrepancy between the two sources decreases sharply with size: 15.8 points for establishments with between 10 and 49 employees and 1.4 of a point for establishments with more than 200 employees.
2. The establishments with fewer than 10 employees excluded from the coverage of the DARES are those where turnover is highest
3. Taking into account non-persistent establishments increases the departure rate by 5 points.

Comparison of the DADS / DARES departure rates

(%)

	All establishments	Persistent establishments	DARES (2001)
1 to 9 employees	70.0	63.5	
10 to 49	61.5	59.0	43.2
50 to 99	56.4	54.4	46.8
100 to 199	51.4	50.1	45.6
200 or more	36.9	36.4	35.0
50 or more employees		*42.8*	*39.5*
Total	56.6	51.7	41.0

Note: workforce tranches are those used in the DARES publications in order to permit comparison. The rates are in relation to the workforce at the beginning of the period. Temporary employment agencies are also excluded by the DARES.

If one takes only establishments with at least 50 employees[19], the difference is less than three points. For establishments with 10 to 49 employees, the difference is more than 15 points but the DARES source (EMMO) is not exhaustive. Moreover, for some inexplicable reason, whereas the turnover rate decreases steadily with size, that of the 10-to-49-employee establishments is less than that of the 50-to-99 establishments. All in all, the overestimation of turnover in the reprocessed DADS database cannot exceed 5 points. One more point is that the declaration to DMMO is not compulsory for short-term contract of 1 month or less. This could explain why the difference between DADS where these short-term contracts are reported - and DMMO is bigger for small plants than for large ones.

Breakdown of the JF and the WF

	NF_R (1)	ARD_R* (2)	PMT_R** (3)	IAV_R (4)	RDI_R (5)	RoI_R (6)	CF_R (3)+(6) - (4) - (5)	JF_R (1) + (2) +(4) + (5)	WF_R*** (2)+(3)+(6)
All	3.8%	8.4%	19.1%	4.9%	16.2%	37%	36%	33%	67%
Profit	3.6%	7.9%	16.9%	4.1%	16.0%	31%	28%	32%	57%
Temporary	12.9%	26.3%	49.6%	29.6%	10.8%	154%	163%	80%	236%
Civil service	1.5%	3.2%	15.0%	3.1%	9.2%	17%	19%	17%	36%
Non-profit	3.4%	9.6%	24.7%	6.2%	25.9%	52%	44%	45%	88%

* In this case, the rate takes no account of simple grouped flows

** This rate is above the one shown in the paragraph on permutations, for two reasons: 1/ movements followed by a return to the same establishment are not counted as permutations in the annual analysis but are counted here; 2/ the limitation to one post per employee, not adopted here, reduces the permutations.

*** Ignoring the net flows

The JF explain half the WF for the enterprise sector, slightly less for the others (see table).

The separation of the WF into one part linked to the JF and one part consisting of pure roll-over seems clear in theory but is less so in practice. The departure of one employee followed by his/her replacement by another is considered as related to a JF if the 20th day of the month[20] falls in the period during which the post is not filled. Phenomena of this kind cancel each other out more easily in the large establishments than in the small. Conversely, the creation of an unskilled post and the suppression of a skilled post may cancel out and appear to be pure roll-over. Here again, it will appear more often as roll-over in the large establishments. Persistent establishments with fewer than 5 employees have a residual rate 60% smaller than their infra-annual redistribution rate, whereas in

[19] The field is that of the DMMO. Direct comparison with the DMMO for the establishments present in both sources confirms the close similarity of the turnover rates.
[20] Workforces are counted every 30 days starting from D110.

establishments with more than 250 employees, it is 20% higher (see table). These questions of consolidation probably explain a large part of this difference. A similar difference, but less pronounced, is to be found in the allocation between permutations and redistribution. There is nevertheless a positive correlation between infra-annual JF and residual WF. Complementarity (with JF generating WF with a multiplying factor of greater than unity) therefore wins out over substitution (one and the same WF can, depending on context and especially size of establishment, appear either as the resultant of gross employment flows or as pure roll-over).

	NF_R	T/o_R	ARD_R	PMT_R	FBI_R	CF_R	PMT/ARD	CF/FBI
1 to 4	12%	65%	7%	13%	32%	12%	1.7	0.4
5 to 9	3%	62%	8%	15%	27%	12%	1.8	0.5
10 to 19	3%	61%	7%	15%	24%	15%	2.2	0.6
20 to 49	4%	58%	6%	15%	21%	17%	2.7	0.8
49 to 249	3%	52%	5%	13%	16%	18%	2.7	1.1
250 or +	1%	35%	4%	10%	10%	11%	2.9	1.2

Field: persistent enterprises

Seasonal variations in employment: a non-negligible component of total JF

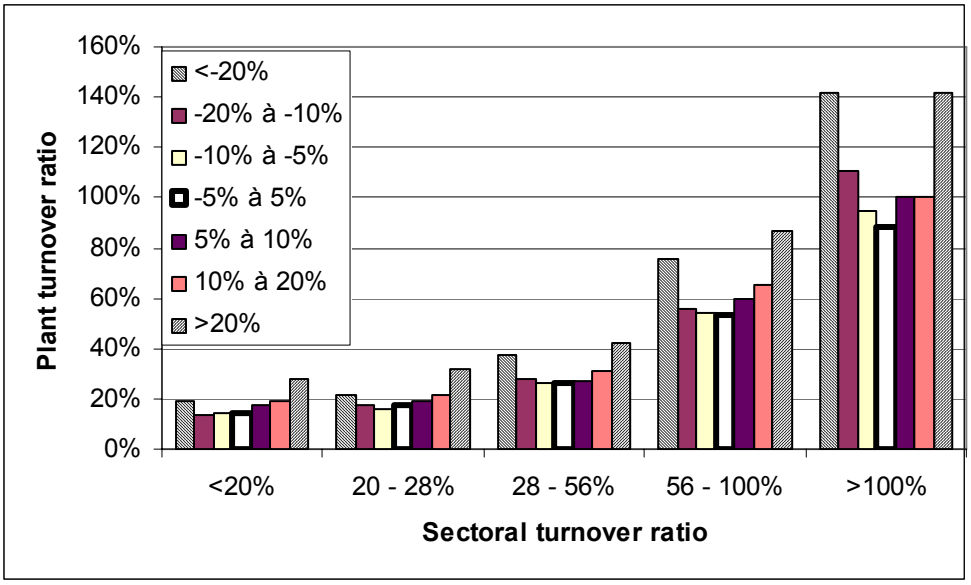
Even for constant annual workforce, seasonal variations in activity generate infra-annual JF and WF. At aggregated level, there are 600,000 to 700,000 more jobs in July-August than in May or October and the JF associated with these seasonal variations correspond to 5% of the average workforce. A higher level of aggregation can mask certain seasonal variations. The hotels and catering sector has a particularly high seasonal variation rate (22%), higher than its annual redistribution rate of 13%. At the other end of the scale, non-profit institutions in the "other cultural activities" sector have quite a small seasonal variation rate (9%) by comparison with the annual or infra-annual redistribution rates (19% and 51%, respectively).

Turnover rates depend more on sectoral characteristics than on annual JF

Intersection between the breakdown into 4 fields used until now and the 114-heading NES permits, after the elimination of impossible cases (the temporary agency sector corresponds to a single heading in the 114-heading NES) and the grouping together of rare cases, to define 124*** sectors. Unless otherwise indicated, the analysis will always be made excluding temporary agencies. When the name of a sector is cited without specifying its legal status, this is because it consists of enterprises coming under neither the civil service nor the non-profit sector.

The sectoral turnover rate (permutation rate + roll-over rate = WF excluding annual JF) varies from 8% for the "coking and nuclear industry" sector to 193% for audiovisual activities. Permutation rates and roll-over rates are very highly correlated (correlation ratio of 0.86). The range of roll-over rates is much wider (2.5% to 159%) than that of the turnover rate (5% to 35%), the latter being, for one thing, bounded at 100% and, for another, including an incompressible component (retirements, for example). In the quasi-linear relationship between turnover and permutation, the exceptions are the non-profit institutions in the education sector, which have a high permutation rate (30%) in relation to the roll-over rate (37%), and non-profit institutions in the real estate sector (possibly residence management bodies) with a low permutation rate (12%) in relation to the roll-over rate (56%).

Turnover rates of establishments by their growth and the turnover rate in their sector



Field: establishments with between 20 and 49 employees (Min (Ef_{1999}, Ef_{2000})) excluding temporary agency workers

In legend box: evolution in the employment of the establishments related to their minimum workforce

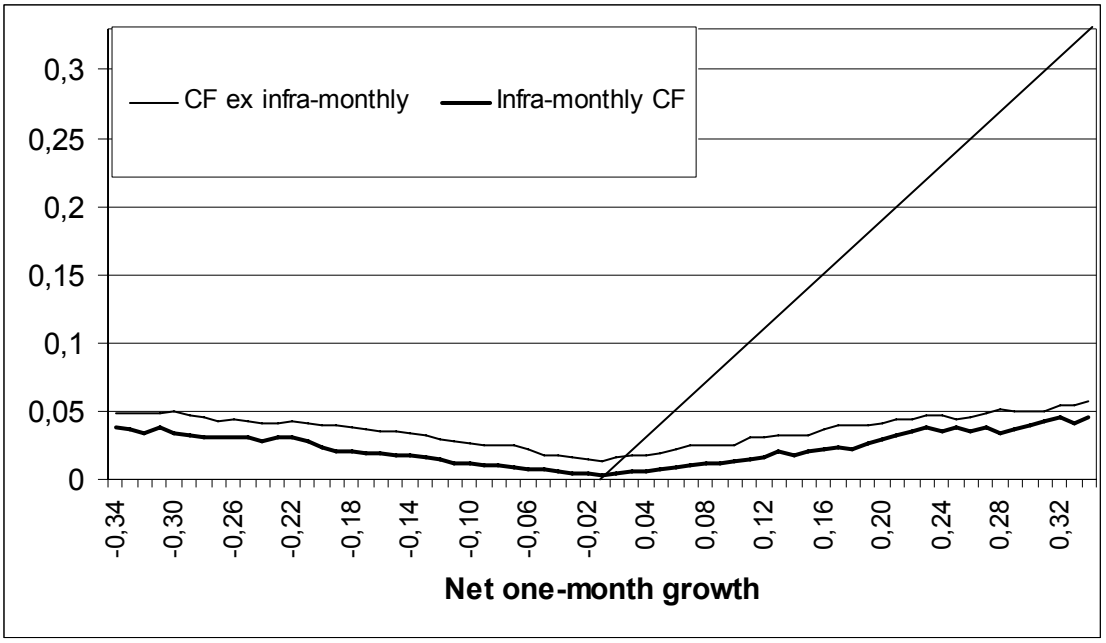
While establishments creating or destroying a large number of jobs have turnover rates higher than for establishments whose employment is relatively stable, this effect is substantially dominated by the sector to which they belong. Establishments with stable workforces in sectors with high turnover rates have turnover rates 2 to 3 times higher than those of establishments creating a large number of jobs in sectors with low turnover rates (see graph).

Interpreting the links between turnovers and infra-annual JF is problematical: only infra-monthly turnovers are strongly linked to monthly JF

The independence of WF vis-à-vis annual JF does not indicate total independence between the two types of flow. Establishments experience numerous temporary variations in workforces and the WF are able to reflect the adjustment to these flows. Since WF are a continuous measure[21], the shorter the unit period for the calculation of JF, the closer the JF come to the WF. Furthermore, the causality relationship may be reversed: if an employee resigns on the 20th day of the month and if the employer takes 15 days to find a replacement, this can generate, in the absence of compensation through a reverse movement, one job destruction followed by one job creation. The distinction proposed by Davis between JF that are not related to the supply of labour and WF that are related both to demand and to supply no longer holds. Even leaving aside this first difficulty of interpretation, there remains that of knowing whether one should take all the WF, as do Davis et al. (2005), or the excess of WF over JF, as do Burgess et al.(2000). In the first case there is a tendency to explain WF by JF whereas in the second case, the CF (CF = WF - JF) seem to be related more to an idiosyncratic component of the enterprises. I incline more to the second interpretation and propose to interpret the Davis et al. results in this light. In fact, when they insist on the high degree of non-linearity in the relationship between JF and WF, to the point that, in the case of job destructions: "The slope of the separations-net [establishment growth] relation is approximately minus one to the left of zero", this signifies that if one takes only the CF the result is a horizontal straight line, showing that in this case the CF are indeed independent of the JF. The portion of WF that increases in linear fashion with JF is of little interest because it is impossible, by definition, to have a JF without at least one WF. Other figures provided by Davis et al. lend weight to our interpretation, in that they show the WF to be less concentrated than the JF: establishments with persistent employment in which the employment varies by more than 5% account for as much as 73% of the JF of persistent establishments compared with only 49% of the WF. A quick calculation then shows that establishments with low JF - accounting in total for only 27% of the JF - account for 75% of the CF[22].

The CF are not completely independent of the JF, as indicated in the next graph. However, they are far from being non-existent for establishments with stable workforces. If one takes the CF ex infra-monthly (it is the WF ex infra-monthly that are examined in Davis et al.), the rate is 13.4% for persistent establishments with between 10 and 49 employees and stable workforces compared with a weighted average of 18.3%. If the CF are broken down into one component identical to that of the stable workforces and another component dependent on the JF, the first component explains 84% of the CF[23]. Conversely, the infra-monthly CF[24] are more associated with the CF, with the second component explaining 55%. It is normal that the trial-and-error approach should be more productive for the shorter periods of employment.

[21] It is possible to take a discontinuous measure of the flows by eliminating periods of employment that fall strictly between the two bounds of the period in question. It is this type of measure, with monthly periods, that is calculated by Davis et al. in the article commented on in this paragraph.
[22] WF = JF + CF = 2 JF. So JF = CF. Take JF = CF = 100. 73% of JF and 49% of WF means CF = WF - JF = 2 *49 - 73 = 25. Then the complement account for 27% of the JF and 75% of the CF
[23] This is calculated for the whole private sector, by applying to each plant the CF ratio of the average stable plant of the same sector and same size.
[24] No account is taken of periods involving less than 10 hours' remuneration.



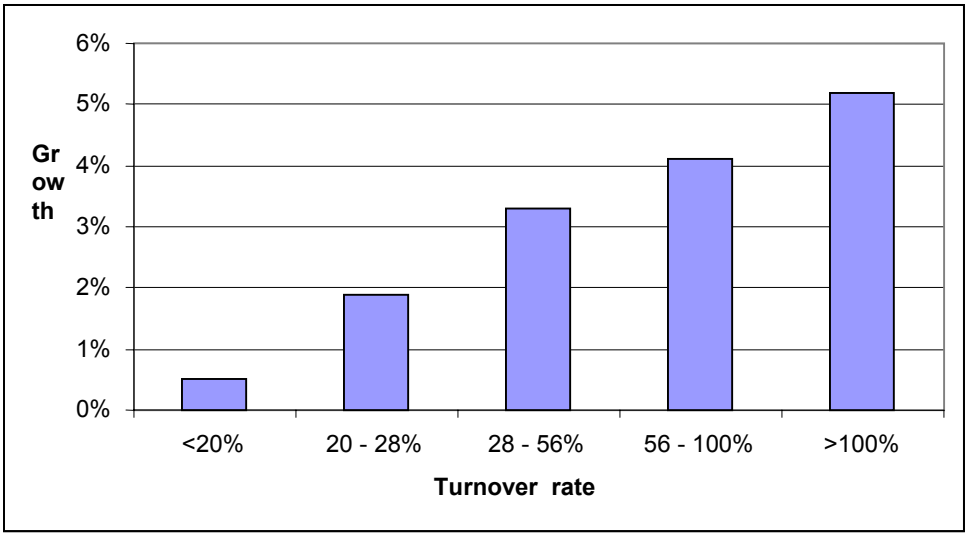
Field: persistent establishments with between 10 and 49 employees in the profit sector

How to read the graph: In establishments whose workforce at the beginning of the month is equal to the workforce at the beginning of the previous month (abscissa = 0), of 1000 employees present, 13 have been present for less than one month (fine curve). For every 1000 employees present, there were three entries and departures in the previous month. For those whose workforce increased by 11%, 31 employees present at the beginning of the previous month departed, while for those whose workforce decreased by 11%, 31 employees present at the beginning of the month arrived during the previous month.

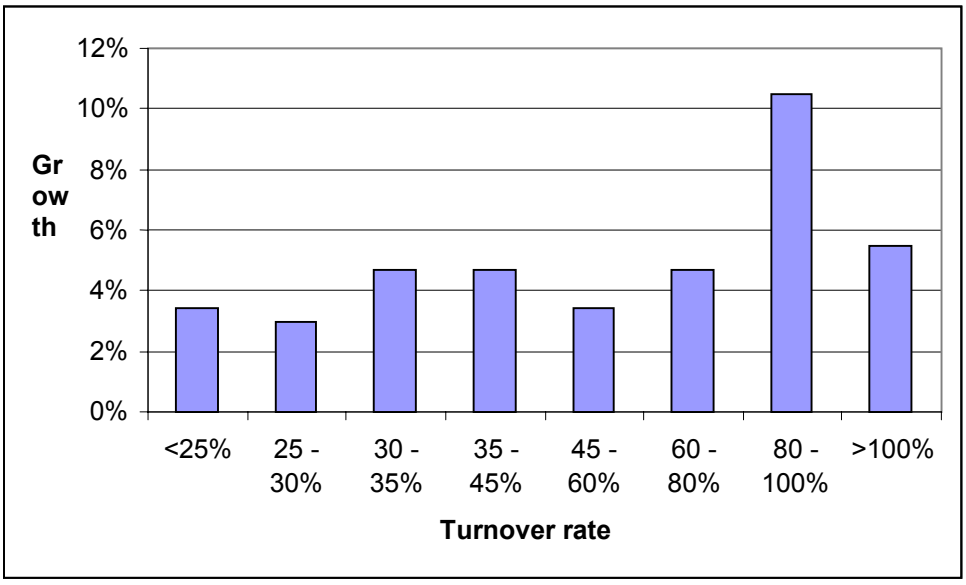
The sectors with high turnover rates are also those that create the most jobs

If sectors are sorted in ascending order of turnover rates, the sectors with high turnover rates emerge clearly as creating the most jobs (see graph). In part, this reflects the opposition between, on the one hand, industry (and the civil service) with good employment stability (but not forgetting that part of industry's need for flexibility is met by recourse to temporary agency employment, which is not included in the turnover rates), whose relative importance declines, and services, on the other. It is difficult to interpret this correlation in terms of causality. In the growth → turnover causal direction, we have just seen that at establishment level turnover is determined much less by growth than by the sector to which the establishment belongs. Moreover, if the interpretation in terms of trial and error in the framework of a matching process makes it possible to explain a turnover rate that is higher for the growth enterprises, it does not explain why the turnover rate also increases in the case of the job-destroying enterprises. One hypothesis might be the departure of the more mobile employees in reaction to the difficulties experienced by the enterprise, departures that have to be compensated by hiring, leading to a higher turnover rate, but this hypothesis is impossible to test. In the turnover →

growth causal direction, it is difficult to explain the lower growth in the case of industry, a tendency related to the greater productivity gains in this sector, by its lower turnover rate. The correlation between sectoral growth and turnover rates seems rather to be related to the active presence of an underlying common cause, namely the growth of employment in sectors with growing demand and low productivity gains, such as personal services, which happen also to be sectors where there is high demand for flexibility. If manufacturing is excluded, the link between sectoral turnover and job creation in the market sector becomes much less clearcut (see graph), which is compatible with the interpretation proposed above.



Field: all sectors other than temporary agency employment

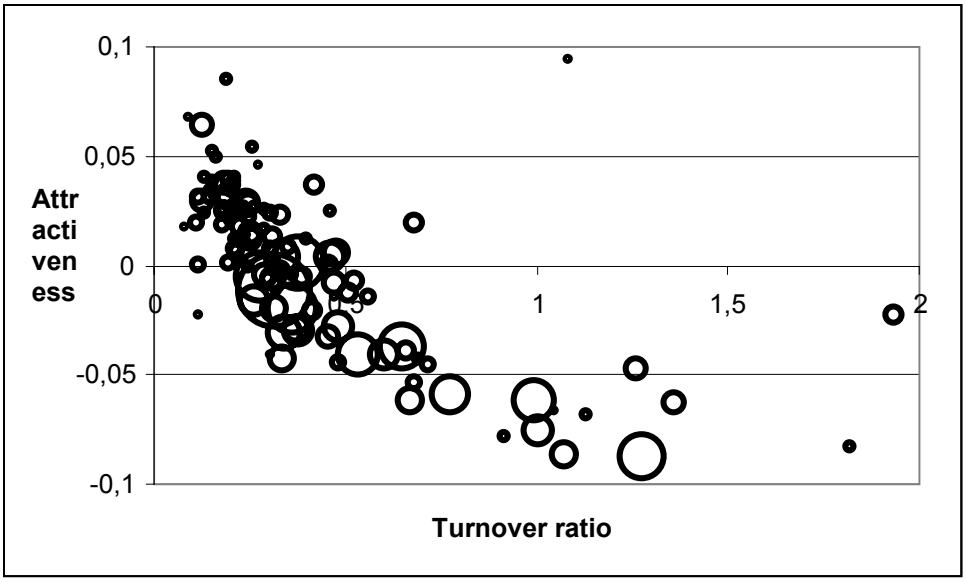


Field: non manufacturing sectors (EH to EQ NES, see http://www.insee.fr/en/nom_def_met/nomenclatures/nes/html/nes_n1.htm)

The sectors with low turnover rates seem more "attractive"

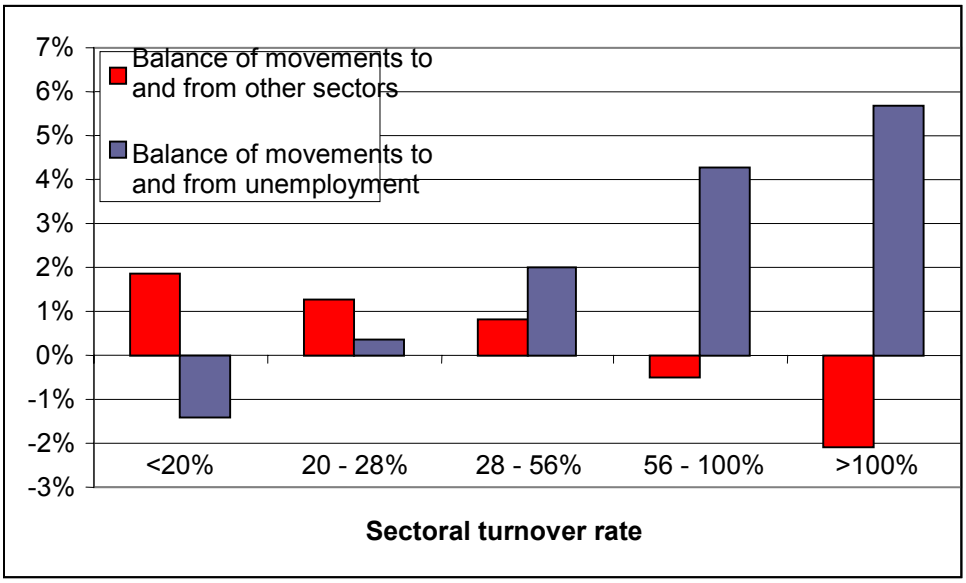
Mansuy and Minni (2005) apply the term "attractive" to sectors that take in more young people with a few years of working experience than young people just joining the labour market. In other words, they attract young people who started their careers in a different sector. This approach can be generalised to a vision of the labour market broken down into "bad jobs" and "good jobs". This segmentation is not hermetic and the acquisition of working experience can enable some people in bad jobs to obtain good jobs. This means that there must be more flows from bad-job sectors to good-job sectors than the reverse, with the deficit in the bad-job sectors compensated by recruitment from non-employment. The analytical database in its annual configuration permits this approach using the split between employment and non-employment, as the situation of workers on D110 and D470 is known. It is then possible to calculate for each sector the balance of movements to and from other sectors (workers employed on both D110 and D470 but having changed sector) and the balance of movements to and from non-employment (workers in employment on one date but not the other). The first of these balances will be greater than the second for the attractive sectors.

Since most workers have a preference for employment stability, it is logical to expect a negative correlation between turnover and attractiveness. The strength of this correlation is nevertheless surprising (see graph). The only sector of importance positioned at a significant distance from the point-cloud is that of audiovisual services (the point furthest to the right, suggesting the possibility that in this case certain specific attractiveness factors make up for the very high employment instability in the eyes of some workers. A possible source of bias tending to exaggerate this correlation is that the sectors with high turnover rates are also sectors with high net job creation. Simply taking into account the high degree of sectoral specificity required in terms of skills would be sufficient to explain why net-job-creating sectors have to recruit more previously-unemployed workers.



The size of a circle is proportional to the workforce in the sector

However, if one looks at the two components of the attractiveness indicator, it is clear that the balance of movements to and from other sectors is a decreasing function of the turnover rate, a conclusion that is all the more striking in that sectors with high turnover rates create more jobs.



CONCLUSION

This study has shown that, twenty years after the first analysis of job flows, measurement is still an issue, at least for France. Further work and cooperation are necessary in order to procure relevant data for international comparisons to become relevant. Moreover, if these results are confirmed, we should investigate more to understand why the gap between job flows in France and in the USA is wider on an annual basis than on a quarterly basis. A comprehensive study of the persistence of job creations and job destructions at different durations would be relevant in this concern.

Interpreting workers flows as only driven by job flows is misleading. The excess of worker flows on job flows are not, for most of them, justified by an optimization of the matches within the framework of creative destruction. They are specific to firms and sectors and their raison d'être should then be better understood especially as workers resent high turnover. Thus, sectors with high turn over can hardly meet their employment requirements even though overall unemployment is high.

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Annex : explanations of the principal acronyms

Abbreviation	French in full	English
BRIDGE	Base relationnelle interrégionale de données sur les grands établissements	Inter-regional relational database for the large establishments
BRN	Fichier des entreprises soumises au régime fiscal du Benéfice Réel Normal	Fiscal source on enterprises
CDD	Contrat à durée déterminée	Fixed-term contract
CDI	Contrat à durée indéterminée	Indefinite term contract
CERC	Centre d'étude, des revenus et des coûts	Center of Studies on Income and Costs
CF	——	Churning flows
DADS	Déclarations Annuelles de Données Sociales	Annual Declarations of Social Data
DARES	Direction de l'Animation de la Recherche, des Etudes et des Statistiques	Centre for research, studies and statistics (Ministry of Employment and Solidarity)
DMMO	Déclarations de mouvements de main d'oeuvre	Monthly Declarations of Manpower Movements
EMMO	Enquete trimestrielle sur les mouvements de main d'oeuvre	Labour Movements Survey
EPURE	Rénovation du traitement des fichiers URSSAF	Renovated processing of URSSAF figures
ETEC	Établissement économique	Economic establishment
FICUS	Fichier Complet Unifié de Suse	Complete unified SUSE database
0ICS	Industrie, construction, commerce, services	Industry, construction, distribution, services
JF	——	Job flows
LEHD	——	Longitudinal Employer-Household Dynamics
LRD	——	Longitudinal research data base
NES	Nomenclature économique de synthèse	Economic summary classification
NF		Net flows
PCS	Nomenclature des professions et catégories socioprofessionnelles	Professional and occupational classification
SBA	——	Small Business Administration.
SIREN	Système informatisé du répertoire national des entreprises	Enterprise identification number
SIRENE	Système informatisé du répertoire national des entreprises et des établissements	Central business register
SIRET	Système informatisé du répertoire national des établissements	Establishment identification number
SUSE	Système unifié des statistiques d'entreprise	Unified system of enterprise statistics
T/O		Turnover
UNEDIC	Union interprofessionnelle pour l'emploi dans l'industrie et le commerce	Inter-occupational union for employment in industry and trade
URSSAF	Union de Recouvrement des Cotisations de Sécurité Sociale et d'Allocations Familiales	Social Security Contribution Collection Office
WF		Worker flows